REMARKS

With entry of this amendment, claims 1-37 are pending. Claims 1, 15, 31 and 33 have been amended, and claim 37 has been added (previously presented second claim 32), leaving claims 2-14, 16-30, 32 and 33-36 unchanged. Claim 33 has been amended to correct an editorial error.

In view of the arguments below, Applicants respectfully request allowance of claims 1-37.

CLAIM OBJECTIONS

Claims 32 have been objected to because two claims were numbered "32."

Claim 37 has been added to correct the misnumbering of claims 32. Specifically, the second previously-numbered claim 32 has been renumbered as new claim 37. Accordingly, withdrawal of the objection to claims 32 is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 1-3, 6, 15, 17-19, 25 and 31-32 stand rejected under 35 U.S.C. §102(b) as being anticipated by Osada et al. (U.S. Patent No. 6,431,682; "Osada").

Independent claims 1, 15 and 31

Currently amended independent claim 1 calls for:

> a plurality of first channels, each of the plurality of first channels having a first length and positioned to fluidly communicate with an ink reservoir, and each of the plurality of first channels terminating in a first nozzle from which ink is ejected during at least one mode of printing; and
>
> a plurality of second channels, each of the plurality of second channels having a second length greater than the first length and positioned to fluidly communicate with the ink reservoir, each of the plurality of second channels terminating in a second nozzle from which ink is ejected during at least one mode of printing, each second nozzle being larger than each first nozzle.

Currently amended independent claim 15 calls for:

> a first channel in fluid communication with an ink reservoir and having a first length;
>
> a second channel in fluid communication with the ink reservoir and having a second length greater than the first length;
>
> a first nozzle from which ink is ejected in at least one printing mode, the first nozzle in fluid communication with the first channel and having a first cross-sectional area; and
>
> a second nozzle from which ink is ejected in at least one printing mode, the second nozzle in fluid communication with the second channel and having a second cross-sectional area greater than the first cross-sectional area.

Currently amended independent claim 31 calls for:

> providing a housing defining an ink reservoir containing ink;
>
> providing a nozzle plate coupled to the housing;
>
> defining a first channel in the nozzle plate in fluid communication with the ink reservoir, the first channel having a first length;
>
> defining a first nozzle in the nozzle plate in fluid communication with the first channel;
>
> defining a second channel in the nozzle plate in fluid communication with the ink reservoir, the second channel having a second length greater than the first length;
>
> defining a second nozzle in the nozzle plate in fluid communication with the second channel, the second nozzle being larger than the first nozzle;
>
> ejecting ink from the first nozzle during at least one mode of printing; and
>
> ejecting ink from the second nozzle during at least one mode of printing.

Osada teaches positioning of an orifice plate with respect to liquid flow paths of a head main body to prevent a failure liquid discharge. Referring to FIGS. 1 and 8 of Osada, Osada teaches a plurality of liquid flow paths 6 formed in a head main body 3, each of the liquid flow paths 6 being in fluid communication with an orifice hole 12 in an orifice plate 4 (Osada, col. 6, lines 34-35 and 60-62). As shown in FIGS. 1 and 8, Osada teaches a plurality

of heating elements positioned in the liquid flow paths 6 for heating the ink and ejecting ink from the orifice holes 12 (Id., col. 7, lines 26-37). A plurality of dummy liquid flow paths 16 are formed in the head main body 3, each of the liquid flow paths 16 being in fluid communication with a dummy orifice hole 15 in the orifice plate 4 (Id., col. 6, lines 35-56 and 57-58).

Osada further teaches that "the dummy liquid flow paths 16 have the same structure as that of the liquid flow paths" (Id., col. 6, lines 38-40). As a result, "the head main body 3 has a plurality of heating elements 5 serving as energy generating elements for producing discharge energy to ink, and has a plurality of liquid flow paths 6 and a plurality of dummy liquid flow paths 16 located corresponding to the heating elements 5" (Id., col. 6, lines 32-36).

However, Osada further teaches that "the dummy liquid flow paths 16...can not be actually used in a recording operation" (Id., col. 6, lines 36-38; emphasis added). Specifically, Osada teaches that "since the heating elements 5 provided within the dummy liquid flow paths 16 are not driven during the recording operation of the ink discharge head, there would be no ink to be discharged through the dummy orifice holes 15" (Id., col. 7, lines 37-41; emphasis added).

As a result, Osada does not teach, describe or suggest:

"a first nozzle from which ink is ejected during at least one mode of printing," and "a second nozzle from which ink is ejected during at least one mode of printing," as required by claim 1, in conjunction with the other features and elements of claim 1;

"a first nozzle from which ink is ejected in at least one printing mode," and "a second nozzle from which ink is ejected in at least one printing mode," as required by claim 15, in conjunction with the other features and elements of claim 15; or

"ejecting ink from the first nozzle during at least one mode of printing," and "ejecting ink from the second nozzle during at least one mode of printing," as required by claim 31, in conjunction with the other features of claim 31.

Furthermore, as stated above, the dummy liquid flow paths 16 taught by Osada have the same structure as the liquid flow paths 6. Accordingly, the length of the dummy liquid

flow paths 16 is not less than that of the liquid flow paths 6, but rather the orifice plate 4 taught by Osada includes projecting portions 13 that surround the dummy orifice holes 15, and which are dimensioned to fit within the dummy liquid flow paths 16 for interengagement of the head main body 3 and the orifice plate 4 (Id., col. 6, lines 59-60 and col. 10, lines 14-32). Thus, the dummy liquid flow paths 16 and the liquid flow paths 6 taught by Osada are actually all formed to the same length, and only appear shorter in FIG. 8, because the projecting portions 13 of the orifice plate 4 have been fit within the dummy liquid flow paths 16. The purpose of the dummy liquid flow paths 16 is to connect the orifice plate 4 to the head main body 3.

As a result, even if the dummy liquid flow paths 16 were used in a printing or recording operation, which they are not, the liquid discharge head taught by Osada does not teach, describe or suggest:

"a plurality of first channels, each of the plurality of first channels having a first length," and "a plurality of second channels, each of the plurality of second channels having a second length greater than the first length," as required by claim 1, in conjunction with the other features and elements of claim 1;

"a first channel in fluid communication with an ink reservoir and having a first length" and "a second channel in fluid communication with the ink reservoir and having a second length greater than the first length," as required by claim 15, in conjunction with the other features and elements of claim 15; or

"defining a first channel in the nozzle plate in fluid communication with the ink reservoir, the first channel having a first length," and "defining a second channel in the nozzle plate in fluid communication with the ink reservoir, the second channel having a second length greater than the first length," as required by claim 31, in conjunction with the other features of claim 31.

In light of the above remarks, withdrawal of the 35 U.S.C. §102(b) rejections of claims 1, 15 and 31 is respectfully requested.

Dependent claims 2-14, 16-30 and 32-37

Dependent claims 6 and 19 both specify:

"wherein the nozzle plate is constructed of at least one of polyimide and phenolic."

Osada teaches an orifice plate 4 that is made of a resin film made of "polyamide, polysulfone, polyether sulfone, polyphenylene oxide, polyphenylene sulfide, or polypropylene" (Id., col. 8, lines 12-14). However, Osada does not teach, describe or suggest making the orifice plate 4 of "at least one of polyimide and phenolic," as required by claims 6 and 19.

Furthermore, claims 2-14, 16-30 and 32-37 are each ultimately dependent upon amended claims 1, 15 and 31, respectively, and are therefore allowable based upon amended claims 1, 15 and 31, and upon other features and elements claimed in claims 2-14, 16-30 and 32-37 but not discussed herein.

CLAIM REJECTIONS UNDER 35 U.S.C. §103

Claims 4-5, 8-9 and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Osada in view of Rapp et al. (U.S. Patent No. 6,626,522).

Claims 7, 12, 26, 28 and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Osada in view of Fujii (U.S. Patent No. 6,457,796).

Claims 2-14, 16-30 and 32-37 are each ultimately dependent upon amended claims 1, 15 and 31, respectively, and are therefore allowable based upon amended claims 1, 15 and 31, and upon other features and elements claimed in claims 2-14, 16-30 and 32-37 but not discussed herein.

CONCLUSION

In view of the amendments and remarks presented herein, it is respectfully submitted that the claims as amended are in condition for allowance. The Applicant requests that the Examiner telephone the attorneys of record in the event a telephone discussion would be helpful in advancing the prosecution of the present application.

Respectfully submitted,

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